CPSC 421/501

- Myhill-Nerode
  - $\{0^n 1^n\}$ is nonregular
- Implication:

  $\{0^n 1^m 0^p \mid n+p=m\}$ is non-regular

  (intersect with regular language $0^* 1^*$)

- Myhill-Nerode
  - Min DFA for $L = a^{23} a^*$

    " " " $L = a^{23} a^* \cup \{a^0, a^1, a^5\}$

Breakout Room Problems:

(1) Show that $L = \{ 0^{n^2} \mid n \in \mathbb{Z} \}$ is nonregular

(2) Show that $L = \{ 0^n 1^m \mid \begin{matrix} n, m \in \mathbb{Z} \\ n \geq 2m \end{matrix} \}$ is non-regular

(3) Show that

$$L = \left\{ w \in \{a,b\}^* \;\middle|\; \begin{matrix} w \text{ has the same} \\ \text{number of } a\text{'s} \\ \text{as } b\text{'s} \end{matrix} \right\}$$

is non-regular

(4) If $w = \sigma_1 \ldots \sigma_k$, then $w^{\text{reverse}} = \sigma_k \ldots \sigma_1$

e.g. $(abb)^{rev} = bba$

Show that

$$\text{PALINDROME} = \{ w \in \{a,b\}^* \mid w = w^{rev} \}$$

is non-regular.

(5) Give a DFA with the few possible states accepting $(aab, ab)^*$:

(5a) Give the DFA

(5b) Use Myhill-Nerode to prove that your DFA has the fewest possible states.